REMARKS

This paper is submitted as part of Request for Continued Examination under 37 CFR § 1.114.

Claims 1-59 have been cancelled, without prejudice, and replaced by claims 60-78. No new matter has been introduced through this amendment.

The amendment is responsive to the claim rejections as set forth in the Office Action dated May 30, 2003.

As defined in sole independent claim 60, the presently claimed invention is directed to flexible thermal control composites comprising an endothermic agent dispersed, distributed and suspended within a polymer. The polymer can be any of a large group of materials (see for example page 7 of the specification) and are characterized in that they have a molecular structure consisting of long chains of mostly linear molecules, which after being relaxed or softened by controlled heating, dissolution or suspension in a plasticizer or solvent, provide the interstitial spaces through which the endothermic agent is dispersed, distributed and suspended prior to curing (see for example page 7, 2nd full paragraph and page 10, 1st full paragraph) and are fixed therein by curing (see for example the bridging paragraph, pages 8-9).

Claims 61-78 are directed to preferred features and/or embodiments and all depend on claim 60.

The Examiner has rejected claims 1-59 under 35 U.S.C. 102(b) as being anticipated by Hayes.

Hayes it is noted is the same applicant as named herein and the earlier Hayes patent was referenced in the instant application at page 2 thereof. As recited in the application at page 2, paragraph, U.S. Patent No. 5,709,914 discloses a thermal storage compound packed into an open cell network, comprising natural, synthetic or metal fibers, spheres, particles, foams, or materials capable of being formed into a container suitable for

enclosing and maintaining an item's high heat. As expressly recited in the ensuing paragraphs (pages 2-3), "there are two serious drawbacks to the prior art..." namely leakage of the endothermic compound on compromise of the physical integrity of the supporting structures and the stiffness and inflexible nature of the composite materials.

Claim 60 which replaces prior claim 1 expressly recites that the polymers have "a molecular structure consisting of long chains of mostly linear molecules which prior to curing provide interstitial spaces through which the endothermic agent is distributed, dispersed and suspended and becoming fixed therein on curing".

The Hayes patent, in contrast, is directed to a food container comprising a fibrous matrix which has embedded within the matrix by adhesion, absorption or chemical bonding an endothermic agent (column 2, lines 36-40). The patent describes the matrix as formed of an open cell network, i.e., mesh, powders, solid form fibrous batting, wad of closely bound material or fibers, strips of clumped metal, plastic or sheets, having increased internal surface area and at least some completely surface to surface openings, pores, interstices or passageways for convection current and spread of a liquid PCM or endothermic agent between the surfaces of the matrix.

The Hayes matrix may be in any form such as absorbent batting material, fibers and the like. It may be woven or cloth, or in the form of particles and shredded and chopped and powdered material as well as foam structures where capillary action retains the endothermic agent and in which thermal conductivity can be controlled. The Hayes patent discloses the use of polymer materials for the matrix, but as described, the matrix is fibrous (Kevlar batting) employing a polyethylene polymer endothermic material (Columns 5 and 6).

Hayes does not teach or suggest the flexible thermal control composites of the invention wherein the endothermal agent is incorporated into the polymer prior to its curing and at a point wherein the polymers which consist of long chains of mostly linear molecules have been softened so that they provide the interstitial spaces in which the endothermic agents are distributed, dispersed and suspended and in which after curing they

remain fixed. Hayes accordingly does not teach or suggest the invention as set forth in claims 60-78. Hayes does not and cannot provide a heat sink material which is flexible, light, thin, drapable and conformable while insulating against high or low heat environments.

The Examiner has rejected claims 1-4, 9-10, 13-14, 17-18, 21-24, 29-30, 33-34, 37-38, 41-44, 49, 52-53 and 56-57 as anticipated by Tzur (U.S. Patent No. 4,632,865).

The Tzur patent is directed to intumescent-ablator fire retardant materials in the form of multilayers. The structure has two or more layers which have been arranged so that the external layer has a higher melting temperature or temperature of dehydration than any other layer, the external layer comprising an inorganic salt and the binder is natural rubber, neoprene rubber, silicone rubber, polyester resin, epoxy resin, phenolic resin, hydraulic cement, alumina, silica, etc. As stated by Tzur (column 2 lines 38-42), his intumescent-ablative endothermic multilayer structure results from the incorporation of a strong ablator containing hydrated inorganic salts, combined with an intumescence agent. Tzur recites at column 3, lines 20-23 that he wishes to stress the use of cork as an ablative material, it being combined with an elastomeric binder through a conventional rubber production process.

There is no disclosure in Tzur of the criticality of the use of a polymer (and a specific polymer having the molecular structure as herein described) or that the ablator (endothermic agent) be distributed, dispersed and suspended in the interstices of the polymer formed expressly prior to incorporation of endothermic agent and prior to curing of the polymer whereby on curing the endothermic agent is fixed in those spaces.

Tzur accordingly does not teach or suggest the invention as claimed.

The Examiner has also rejected claims 1-59 under 35 U.S.C. § 102(b) as anticipated by Buckley (U.S. Patent No. 5,722,482).

According to Buckley, a flexible composite material with thermal storage properties is provided in which the phase change thermal storage material is dispersed

within a flexible matrix material, preferably a flexible polymer or a polymer foam, either open cell or closed cell. The phase change material is added directly to the matrix material in the form of pellets or particles. The phase change material can be used in an encapsulated form, to prevent it from migrating if it is a liquid and so that it does not form one solid inflexible mass as it cools. The important point is that the phase change material has to be provided in a form whereby it is prevented from migrating in the matrix material. At columns 5-6 of the patent, fourteen processes are disclosed for making the thermal storage composite, not one of which recognizes or could result in the formation of the thermal control composites of the invention, i.e., one in which an endothermic agent is distributed, dispersed and suspended in a polymer selected to have a molecular structure consisting of long chains of mostly linear molecules which prior to curing provide interstitial spaces through which the endothermic agent is distributed, dispersed and suspended and in which on curing they will become fixed.

The Buckley patent clearly does not teach or suggest the claimed invention or one having its advantages.

The Examiner's rejection of claims 5-8, 11-12,15,16, 19-20, 25-28, 31-32, 35-36, 39-40, 45-48, 50-51 and 54-55 as being obvious (35 U.S.C. 103(a)) over Tzur is also not well taken.

The basic invention as set forth in claim 1 has not been rejected as obvious over Tzur. The failure of Tzur in this respect is noted and it is submitted that the teaching of certain preferred features of that basic invention similarly must fail.

It is submitted that all of the claims in the application (new claims 60-78) are allowable to the applicant and notification to this effect is respectfully requested.

Respectfully submitted,

By: Evelyn M. Sommer

Evelyn M. Sommer, Reg. No. 19,603
Cummings & Lockwood
700 State Street
P. O. Box 1960
New Haven, CT 06509-1960
Tele: (203)351-4229

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